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Innovative practices

Energy Savings in Public Properties in the Municipalities of Egedal

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Publication date:
2014

Document Version
Accepted author manuscript, peer reviewed version

[Link to publication from Aalborg University](#)

Citation for published version (APA):
Quitzeau, M-B., & Hoffmann, B. (2014). *Innovative practices: Energy Savings in Public Properties in the Municipalities of Egedal*.

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Innovative Practices

Energy Savings in Public Properties in the Municipality of Egedal



CONCERTO is co-funded by the European Commission

Colophon

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Published in January 2014.

This work has been developed in close
cooperation with the Municipality of
Egedal as part of the EU Concerto
Project 'Class 1'.

Photos and layout by Charlotte Quitzau.



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- p. 3. ‘Developing innovative practices’ explains what we mean by innovative practices and why they are important.
 - p. 5. ‘Innovative practices in Egedal’ provides an overview of the municipality’s distinctive way of working.
 - p. 11. ‘Innovative practices on multiple platforms’ takes an in-depth look at how different approaches are necessary for realizing energy savings in municipal practices.
 - p. 22. ‘Tools’ designates a number of well-known tools that have helped employees in Egedal in the innovation process.
 - p. 24. ‘What can we learn’ gathers the main conclusions.

Foreword

Many municipalities would like to pave the way for energy savings and the gestures are grand. These grand gestures often end up in strains. The challenge comes when they are to be realized. It is difficult to see how the results can be implemented. Too often, the grand gestures remain as plans on glossy paper. Egedal is an ambitious Danish municipality in energy. They have in recent years worked hard to achieve energy savings. The peculiarity of this municipality’s work is that it has retained a responsive approach to realizing the ambitions. This is done in recognition of the fact that it is difficult to effect change.

The responsive approach stands in contrast to the technically innovative lighthouse projects. In Egedal it is about getting the more low-tech, energy-efficient solutions integrated. And how the municipality can strategically pave the way for saving energy in their daily tasks.

As researchers, we are concerned with how municipalities work to pave the way for realizing sustainable transition. Based on our theories and observations, we believe that responsive work is an important part of what it takes. It is not just visionary plans. We must also work to pave the way for the desired development in the circumstances we find ourselves in. And with the tools that we have available right now. And learn as we go.

The inspiration booklet provides an analysis of Egedal Municipality’s strategic efforts to achieve energy savings in their public properties . We have chosen to focus on this municipality because we believe that other municipalities in Europe can learn from the way it works.

Maj-Britt Quitzau and Birgitte Hoffmann,
Researchers at Aalborg University



Developing innovative practices

There has been a shift in the work to promote energy savings in Egedal Municipality. The overall visions and plans have been complemented by the development of innovative practices. But what would an innovative practice actually mean? And why is it interesting to look into?

What does it mean to be innovative?

Innovation and energy saving initially harks towards the development of new energy efficient technologies. That is often the thought process. But innovation does not have to be all about new technology. In fact, there are already many technical solutions available that can help to reduce energy consumption in buildings. They are just not always used to any significant degree. Therefore, innovation is also necessary in terms of making the well-known energy-efficient solutions widespread.

The lack of dissemination is rarely because of a lack of will. However, municipalities often have many tasks they wish to address within a tight financial framework. Energy savings are not always at the top of the municipal priority list. So it requires that 'someone' does 'something'. That politicians and administration together manages to create a foundation and framework for integrating energy-efficient solutions in daily practice.

It is necessary to challenge the way in which daily operations are organized. To appoint driving force who can stick with energy-efficient solutions in a long, tough process. To prepare the ground for a more experimental process and learn along the way. It requires a targeted effort to pave the way for energy-efficient solutions.

What does it mean to be based on practices?

There may be a long way from desk work with big plans for energy savings to the daily operations of a municipality. It is rarely those who make plans who manage the buildings. But it is the people in daily operations, who have the best opportunity for implementing energy efficient solutions. That is why it is necessary that the plans are at eye level, and bridges are built to daily operations.

To be based in practice, means that planning should increasingly be based on the daily work around the building operations. It is about being able to find the basis for implementing energy efficient solutions. Seeing which conditions exists for making it here and now. Understanding why things do not happen automatically. Without an understanding of how things work in everyday life, it is hard to change the situation.

To be based in practice, means that there must be a strategic effort focused on challenging the rules of the game alongside with those involved. This means going deep rather than going broad so that there is taken time to get the more fundamental changes to happen. This is a long learning process in which the municipal organization adapts step by step.

Why is this interesting?

Developing innovative practices is about creating results immediately. About realizing some of the benefits of integrating energy-efficient solutions. First of all there are the financial benefits of saving energy in building operations. In Egedal, energy consumption decreased by over 500,000 euros annually, since the targeted work with energy optimization took off in 2008. As additional gains can be mentioned better indoor air quality and improved maintenance of the buildings.

Developing innovative practices, is also interesting because it provides for organizational improvement. It supports efforts to ensure interdisciplinary cooperation across administrative disciplines and break down the silos. It helps to systematize and create coordination of various work on a daily basis.

Developing innovative practices, is interesting because it is necessary to change the way we work and the way our system is structured. The conversion does not happen by itself or with the help of master plans. There is a need for exploring new and practical approaches and learn from them.





Innovative practices in Egedal

The starting signal for the innovative practices in Egedal occurred at the planning of a new residential area. Since, the targeted efforts to promote concrete energy savings has been systematised and anchored in the municipal organization. In this section we briefly describe the background of the municipality's approach and the most current initiatives..

A key focus area in the municipality today and looking forward to 2020 is to achieve energy savings in municipal buildings. The goal is to achieve energy savings of 20-25% and to set up 10,000 m2 of solar panels on municipal buildings. Therefore, the municipality embarked on a long-term process of energy optimization. The municipality has also launched a number of specific renovation projects. Among other things, the municipality is currently in the process of completing a major energy renovation project to secure seven of the municipal properties a B energy marking.

The starting signal

The first experiences in promoting concrete energy savings in Egedal happened in local planning of a new large residential area. Here paved the municipality planning division in collaboration with the politicians the way for the integration of energy-efficient solutions in the new buildings. They did so by making more stringent energy requirements than the former building code. The intention was to create demand and thus provide energy-efficient solutions which were marketable, but rarely seen in the construction process. This has meant that the buildings in the area have increased insulation, and uses technologies such as heat pumps, solar cells, solar thermal and geothermal heating.

The positive experiences of the project was that it is possible to achieve concrete results, even if it is associated with major challenges. This has resulted in further work on energy savings. Drawing on lessons learned, the municipality has established solid 2020 energy requirements for new buildings in the municipality. In addition, the municipality has begun to ensure energy savings in municipal buildings.

This means that the work that was started in the planning department, is now starting to become widespread and embedded in a larger part of the municipal organization.

Realistic goals

Trustworthy objectives are important to the municipality. The overall objective of the whole municipality as a geographic area (including the private construction, trade, transport, etc.) is to achieve a 4% reduction in energy consumption for 2020. The objective is realistic based on an assessment of the framework conditions and available means. The objective was specifically identified when the administration presented a catalog of possible solution strategies to the planning committee. Subsequently, the planning committee selected the solution strategies which could realistically be implemented. Afterwards, the administration has calculated that it corresponds to an overall reduction in energy consumption of 4%, as shown in Figure 1.

Mål for 2020	Egedal	Danmark
Reduktion i energiforbrug	4 %	20 %
Reduktion i CO ₂	7 %	40 %
Dækning fra vedvarende energi	8 %	30 %

Figure : Energy targets for 2020 for the Municipality of Egedal and Denmark. From 'Energy in Egedal'

Energy savings in municipal buildings is a central focus in order to achieve the objective. The strategy is to strengthen the ongoing work on energy optimization of the municipality's own properties. Furthermore, there is a desire to realize the total viable potential for investment in energy renovations in their own buildings of 180-220 million DKK.

“The reduction targets have to be credible, and it is for me to say what you do and do what you say. I do not want to participate in the discipline in which you just set some ambitious goals and then you don't achieve them anyway. “

Jan Poulsen, specialist consultant, Egedal



Facts about Stenlose South

- Area of 76 acres south of the city of Stenlose north-west of Copenhagen in Denmark
- Expansion with 800 homes
- Variation of cluster houses, detached houses, rowhouses and blocks of flats
- The area is still being developed Particular requirements for low energy



Organizational Change

The municipality is continuously working to further develop and adapt the organization and in this context focus on strengthening innovation. A concrete measure includes developing a vision of ‘Stronger Culture’, which aims to make engaged employees and managers who are better at controlling development in relation to changes in the environment. The organizational change means that there is internal work to create a better environment for employees to work innovatively. The municipality is also working with other forms of organizational changes that are designed to streamline, organize and improve internal workflows. It should also help to break down the silos in the organization and to strengthen the interdisciplinary work.

Energy optimization

Energy optimization of municipal property was strengthened in 2008 with the appointment of an energy coordinator. The coordinator is now anchored in the Department of Project Engineering in the Centre for Municipal Properties and Internal Services, but working largely transverse. The coordinator records and documents the energy consumption of approx. 220,000 m² of municipal property, the municipality administrators. The properties include administration buildings, schools, institutions, etc. An internal pool of 800,000 euros has been allocated which the energy coordinator can prioritize to implement various specific energy-saving initiatives.

One initiative has been to integrate energy savings in maintenance projects. With a maintenance backlog on the municipal properties of 21,700,000 euros, there is always money to implement energy improvements in maintenance projects. The energy coordinator cooperates with the project managers from building maintenance to find maintenance projects where there may be a gain in energy improvement. This means that, for instance, there can be re-insulation of a roof when it requires replacement or maintenance anyway.

Another initiative has been to train the technical service personnel. Here a number of ‘energy fighters’ have been appointed among operators of properties that have a high energy consumption. Schools represent an important concern in this context, because they account for 70% of all energy consumption. Ongoing training consists among other things in organizing a ‘tour-de-heating station’ where the technical service professionals learn more about their heating plant.

A final example of an initiative has been to implement campaigns at the individual institutions. All municipal day-care centers were in 2012 certified as Green Institutions. This means that the daily managers and energy managers are helped to find behavioral savings. At the same time, they can compare the ratios of their energy consumption with other institutions in Denmark.

Wider energy renovation project

An energy survey of the municipal properties shows that there is a potential for investment of 24,7 million to 37,3 million euros. The Planning Committee has decided that the total viable potential should be realized. Initially the municipality allocated 10,7 million euros to complete the renovation of 30 properties. The idea was that there should first be carried out a phase 1 of approx. 2,7 million euros. Here, the buildings’ energy frame for seven key municipal properties (schools and institutions), corresponding to a total of 19,200 m² of heated area, is reduced to 95 kWh/m². This corresponds to achieving an energy label B. In phase 2, energy renovation of the remaining 23 buildings in the pool should be carried out for 8 million euros.

The energy renovation project was launched as an ESCO contract. Politicians liked this funding as it gave assurance that the savings would be realized. An important objective of the offer was that energy savings were achieved through building improvement initiatives, so the maintenance backlog at the same time could be reduced. The ESCO contract ended sadly with a complaint against the municipality’s decision. The result was that politicians cut off the ESCO process to avoid delays in renovation projects due to legal battles.

Instead the energy retrofit project was carried out as an internal development project based on the winning ESCO company’s energy saving catalog. In this context, only Phase 1 of the first seven buildings completed for the administration could manage to handle the job themselves. The investment amount was only 2.7 million euros. One half of the investment has been invested in an actual facade renovation of a school. There has been architects on the sub-project in order to design the facade and complete the project. A project manager from Municipal Properties and Internal Service has been connected to the project in order to ensure control of it.

The other half of the investment has been invested in various engineering optimization of the buildings, such as plumbing, electrical work and carpentry. A small share of this sum (26,700 euros) is also allocated to behavioral measures. The proposed optimization contains everything from replacing windows, switching to BMS system, insulation of attics, commissioning and replacement of pumps, to replacing engines on ventilation systems. A project manager from Municipal Properties and Internal Service has been responsible for identifying and prioritizing the measures to be carried out in cooperation with an advisor from Jens-Peter Madsen ApS. The ESCO company’s energy saving catalog has been used as a basis for prioritization.

Especially the second sub-project has shown that the project scrutiny poses a challenging phase. The purpose of this scrutiny is to assess whether it is the right things that are implemented in relation to the municipality’s economic objectives. The technical review of proposed solutions shows that some of the measures were either not practically feasible or directly adverse to complete. It underlines how difficult it is to turn ideas into reality. In the end, it proved to be difficult to get all the buildings to reach a class B in the economic environment that the municipality has set up.

Establishment of solar cell units

Setting up 6,000 m² of solar panels on nine schools and institutions in Egedal Municipality. Investment of 1,7 million euros. It covers 12% of the municipality's electricity consumption for building operation. The solar cells production of electricity can be followed on an application (see <http://evishine.dk/sites/egedal-ny/?name=Egedal%20Kommune>). The plan is that schools should actively involve the solar cells in teaching. The plan is to set up an additional 4,000 m² of solar cells, so 20% of the municipality's electricity consumption for building operation will be covered.



INNOVATIVE PRACTICES ON MULTIPLE PLATFORMS

“The words should be said and when the words have been said, you have an understanding of it.”

Ib Sorensen, Planning Committee Chairman



Ib Sorensen, Chairman of the Planning Committee in Egedal Municipality, in dialogue with leaders in the administration.

The political platform

Integrating energy savings in municipal buildings deals only to a very small degree with energy. In fact, it is all about everything else: about the political support, about administration, about building maintenance and about operation and use of the buildings. Different platforms in the municipal organization where the theme of energy must be anchored to achieve results reflect this. Below we give an analytical description of how this is managed in Egedal Municipality.

The political support is crucial to realizing energy savings in municipal buildings. It is the politicians who prioritize the municipal areas and sets budgets for administrative work. The political support may depend on whether there is political consensus and confidence in making the required investments.

In Egedal Municipality the work on energy savings is primarily anchored with the Planning Committee. The Committee deals with many things other than energy, but the members pay great attention to promoting energy savings. This attention is due to the success of creating a positive political climate around it.

Dialogue and feedback

There has been created a political tailwind for working with energy savings. It is hard to pinpoint what got things rolling. But there has been a positive feedback loop, where politicians are continuously presented with evidence that the work is bearing fruit. On this basis, there is a constructive and positive dialogue with the administration about what more can be done.

The positive spiral seems to be based on a strong collaboration between the the Planning Committee and the administration. The Chairman of the planning Committee meets regularly with caseworkers and management of the administration. Conversely these often attend the committee meetings. At the meetings the results obtained are presented to the politicians and there is an open and honest discussion of the challenges.

The strong cooperation keeps the focus on energy savings. The administration experiences that politicians actually back up their work and have ambitions in this area. Politicians are experiencing a great sense of comfort that the effort makes sense. It helps to create a constructive political climate in which there is support for the work to implement energy savings. The political support is crucial for the continuous launching of larger and more challenging projects. At the same time there is also a risk that political support may fade out when energy savings are harder to realize.

Decisions based on consensus

In addition to ensuring a good working relationship with the administration, the Planning Committee is also working internally to ensure a good working climate. This means that many decisions today are based on consensus.

In the Planning Committee chemistry and expectations are continuously being aligned. This means that things are being discussed thoroughly until there is nothing more to say. Even when the Planning Committee was established, there was a strong political desire to take the time to think and develop strategies. That is why there was also spent time on the Committee for inspiration tours and lengthy discussions about what the goals of the Committee's work should be. In practice, there are only a few votes in the Committee. Consequently, many of the plans also evolved as a developmental process where the ambitions started small. After this the ambitions have been expanded, as they gained positive experiences.

The broad consensus also means that politicians in the Planning Committee stand by their decisions and manage to secure broad support in the City Council. This has resulted in a good stability in the process where the decisions adopted by the Planning Committee has been implemented. They have managed over time to create a broad political intention of the municipality to work with energy savings.

A responsive approach

Both the close cooperation and consensus-seeking approach means that politicians are more responsive in their approach. Politicians show an interest in how the administration works in everyday life. They listen to each other. They have respect for the diverse interests that are at stake. The result is that political ambitions become less high-flying and abstract. They are realistic and focus specifically on how the ongoing work can be strengthened.

The responsive approach does not mean however that politicians cannot think new thoughts. On the contrary, there is a willingness to try new things. Eg. the Committee has been willing to find new ways to raise money for energy savings. As the budget could not be stretched further, they opened the possibility of testing the ESCO model. And when the ESCO model met challenges, the committee again found a new path in cooperation with the administration. This shows that there is political will to think outside the box. This will help policy makers in paving the way for energy savings on their platform.

The administrative platform

Many municipalities today work with energy savings in the overall administration. They have, for example, energy employees who are committed to working to promote energy savings. The staff can often have a strong impetus to identify opportunities to implement energy savings. The administration's ideas may in some cases have a tendency to get stuck, either because of lack of political ambition or practical obstacles in relation to daily operations.

In the municipality of Egedal, the Energy Coordinator is a key player in the administrative work. She has worked committed to promoting energy savings since her appointment in 2008. She complements the municipality's special consultant working on the development of strategic plans on among others the energy area. The Energy Coordinator has helped create a systematic and sustained effort to present documentation of where to take action and what the savings are. In addition, she has helped engage more operations-oriented employees.

Recording, analysis, and documentation

The Energy Coordinator has helped create a systematic basis for recording the energy consumption. The municipal properties' energy status has been mapped through the energy labeling scheme and data on the energy consumption has been systematized. For one thing, all electricity meters have been mapped and registered in the municipal property database. secondly, there has been obtained access to more detailed consumption data from the various utilities.

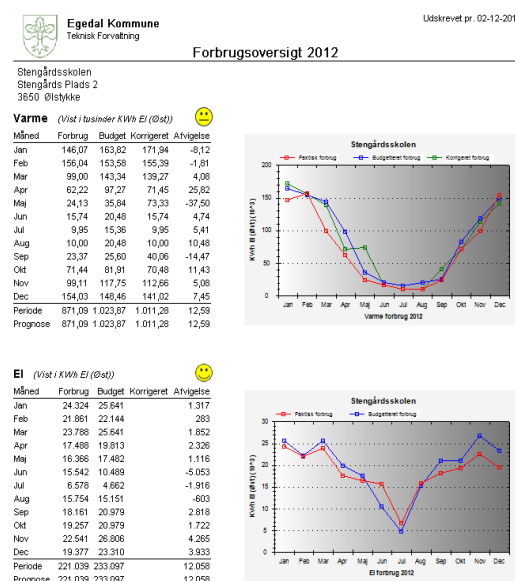
Registration forms the basis for analyzing and documenting where the greatest investment potential lies in relation to buildings, installations and use. The entries e.g. show that school energy consumption constitutes more than half of the total consumption. This analysis and documentation formed the basis for targeted action in the schools. Such targeting means that the biggest savings can be found and good financial results can be ensured.

Targeted efforts on trouble spots

The Energy Coordinator has also worked hard to make the operators think increasingly about energy conservation in their daily work. These key persons are responsible for different interests in the operation of the buildings. So, naturally, energy considerations fall out of view sometimes. The Energy Coordinator supports the operator in remembering the energy issue.

One example is that the ongoing monitoring and optimization of ventilation systems for service and reliability may be downgraded if there is not enough manpower. Here, the Energy Coordinator takes responsibility for putting up a system that ensures regular service and inspection of the ventilation systems by the right specialists at the right time. This means that the systems perform more efficiently and are continuously adjusted with energy savings as a result. By hoisting the flag in different contexts, energy is to a greater extent thought into areas where normally there is no working with energy, or where it can be difficult to make time for it.

The interdisciplinary effort of the Energy Coordinator is backed by management. This means that she has more impact when needed in another part of the administration. In this context, the internal pool of 800,000 euros also increases incentives to work with the Energy Coordinator. Without this support, it would not be certain that the Coordinator would succeed with her programs.



Lisbeth Berg, Energy Coordinator in Egedal Municipality, provides overview over the energy consumption of municipal properties.

A coordinating role

The Energy Coordinator's work springs from the hot spots and practical work in the municipality. The strength of her work is that she shares knowledge and experience across the municipal organization. On the one hand, the Energy the Coordinator contributes that the various conditions around the daily energy consumption become visible to the politicians. On the other hand, the Energy Coordinator also helps translate the political ambitions into concrete actions that can be carried out in the hot spots. This coordination on the administrative platform is crucial for energy initiatives happening in the daily practices.

"I can hoist the flag when the project managers are talking about renovating the roof. I can say, 'remember that it might actually pay off that you are looking at this and that' "

Lisbeth Berg energy coordinator, the municipality of Egedal



Morten Haunstrup and Mahmoud Hamade, project managers, ensure a professional approach to operation of municipal properties.

The constructional platform

Many municipalities have dedicated project managers who are responsible for the daily operation of the municipal properties. These employees have an overview of the ongoing maintenance of the properties. They also have great insight into the properties' constructions and technical details. They typically know the properties well. It can be difficult to incorporate energy savings in the projects because the need for tough prioritizing to solve the economic puzzle.

In Egedal Municipality, the project managers of the Center for Real Estate and Internal Services are responsible for building maintenance. In 2012 there has been a strengthening of their work by further professionalisation of building maintenance and operation. This means that employees have become increasingly specialized for carrying out specific tasks. There is also a greater academic emphasis on building operations. The project managers represent an important link to the constructional implementation of specific projects.

Integration of energy for maintenance

The project managers' primary responsibility is to ensure the long-term maintenance of municipal buildings. This means that they are helping to create an overview of what condition the buildings are in and ensure that maintenance is carried out when it is necessary.

There has been prepared operation and maintenance plans for all municipal properties. These are prepared on the basis of condition reports prepared by an outside firm. The plans contain information about which investments to be carried out when, in order to keep the buildings up to date. This knowledge creates a good basis for prioritizing energy measures that can be integrated into the general maintenance and major renovation projects. This allows for achieving some overall economic gains.

A challenge in this context is that there is backlog maintenance. Condition reports show that it will require an investment of 50,7 euros to bring the buildings back to what amounts to new, here and now. The large maintenance backlog means that the project managers are struggling to afford the implementation of improvement that are essential for the life and functionality of the buildings. Seen in this light, it is difficult to prioritize quality and energy savings.

The maintenance plans can also be used to document the need to prioritize funding for maintenance of municipal buildings. The plans mean that politicians can better see and understand the arguments presented by the administration when there is a demand for more funds. The maintenance plans are a strong argument, which the Planning Committee may communicate to the Finance Committee and the members of the Municipal Council.

“We spend more time managing ‘no money’ than on managing ‘money’. That is the reality we live in, and we can’t pretend that does not exist “

Morten Haunstrup, property project manager, the municipality of Egedal

There is close cooperation between the Energy Coordinator and the project managers in building operations. This means that there will be a greater overlap between building maintenance and energy savings. Without overlap, there is a risk of it running in two separate silos. By creating synergies across it is possible, for example, to increase the insulation level, when the roof needs repairs anyway.

The maintenance plans represent a potential for integrating energy savings. Unfortunately, it is difficult to realize the savings in practice. Until then, it is especially the Energy Coordinator’s funds that has created room for the integration of energy savings in ongoing maintenance. The potential for integration is far greater compared to the backlog, though.

Local knowledge of the buildings

The project managers have extensive knowledge of local properties. They work on a practical level with construction drawings and inspection of the buildings. They also have close contact with the technical service personnel and users who work in or use the buildings. The project managers’ local knowledge of the buildings means that they can ensure the quality of the energy measures to be implemented and to ensure that it becomes properly functioning solutions.

Compared to the renovation process, it turned out that several of the technical solutions proposed in the ESCO contract were not detailed enough. This has meant that the project managers in cooperation with the advisor from Jens-Peter Madsen ApS has stripped off several solutions. They could either not be implemented or were not worth the chase. This shows that it takes good local knowledge of the building to assess, which solutions are appropriate. An overall assessment and inspection may prove not to capture essential details. The premises have turned out not to be implementable or would be inappropriate. The project managers have thus helped ensure the quality of the technical solutions that were planned, through a detailed scrutiny of the project.

Building and system technical expertise

The project managers are professionally equipped to assess the correlation between repayment and life of the building. This means that from an overall economic point of view they are able to assess what is most worthwhile completing. Moreover, they can put it into perspective relative to the life of the building.

In the energy renovation process, the project managers, in consultation with an adviser from Jens-Peter Madsen ApS, has been responsible for prioritizing the energy measures that would be most appropriate for implementation in the designated properties. The prioritization is based on an overall assessment of which solutions are most worthwhile based in economic or maintenance considerations. These economic considerations are made based on the repayment period. This means that the operation must be able to pay for itself within its lifetime. For some initiatives the repayment period is high, but if there is maintenance-related gains, in certain contexts the initiative is implemented anyway.

In order to assess the technical solutions in relation to each other, the adviser from Jens-Peter Madsen ApS, made an inventory of all the technical solutions proposed. For each of the proposals, it is calculated, what the necessary investments, savings and pay-back time is. Some of these are based on empirical assessments that the project managers do not necessarily possess. The overview provides a basis for prioritizing individual solutions in relation to each other and give an overview of the total pool of programs. The energy label calculation method has been used to make these estimates and calculations.

The technical calculations form the basis of prioritizing the solutions, most worthwhile completing. These priorities cannot be made by the external advisor, because there may be some considerations which should be included in addition to the purely technical and economic.

These are expressed for example in how the project managers have been calculating, and prioritizing a few suggestions, although they have a long repayment period. This is based on the view that the solution still may make sense because the component of the maintenance plan may soon need to be replaced. In this context, cooperation between the advisor and the project managers played a significant role. The advisor from Jens-Peter Madsen ApS, explained the purely technical terms, while the project managers were able to make some more practical assessments. This way the theoretical calculation has also been examined from more practical municipal considerations.

Technical qualifications

The project managers’ work with energy indicates that technical qualifications are important. On the one hand, these managers has a technical overview of the state of the property. They have a good position for identifying, where savings could be incorporated. On the other hand, these managers have a technical insight that could qualify the prioritization and selection of solutions in an energy renovation. The reason is that many energy savings are very technical. By leveraging the technical and local knowledge that the project managers and their counsel have, more comprehensive economic and efficient solutions can be achieved.



The operation and use of the buildings

The municipal properties serve some essential functions of the municipality. Hence the use of the buildings are a key element in a municipal context. It is not always that the use of the buildings can be incorporated in an energy context. It can be difficult to bridge the gap between the often technical considerations on energy and the more 'soft' values connected to the building's features.

In Egedal, municipal property is used for e.g. administration, schools, and day care centers. Users are therefore municipal staff in the form of teachers, students and the like. They use the buildings in their daily business, and only to a small extent focus on energy savings. Additionally there are also the technical service personnel. They typically work at schools and institutions and ensure that they function on a daily basis..

Involvement of daily users

The daily users have an expanded local knowledge of the property, which may be important for ensuring the quality of the solutions in energy renovation. Although the project managers have strong local knowledge, the daily users know to a greater extent the functionality of the buildings through their use and work on site. Although the daily users do not necessarily have the focus on and sense of energy savings, they have significant knowledge of the building's functionality.

There are several examples in the energy renovation process of building users having contributed to upgrading and improving technical solutions. e.g. Deputy Principal at a school pointed out that there

were plans to set up airmasters in some rooms that are rarely used. These airmasters were then instead moved to some other classrooms, where they would do more good. A technical service employee at the school has also provided input in terms of how the sensors for light can best be set up so that they do not turn on in unnecessary situations.

This shows that the interaction with the daily users in the energy renovation process can provide some useful contributions. In the actual process surrounding one school it has primarily been the Deputy Principal, who has been involved. The interaction has also primarily been about solving the practical puzzle in terms of energy renovating a functioning school. However, there have also been held meetings about the plans between the project managers and the Deputy Principal. Also e.g. the school's safety representative have been involved.

There has been an involvement of users which has shown great potential for ensuring the quality of the solutions. The involvement, however, appears to need to be systematized and used more. For instance, some of the discussions could have gone deeper into an understanding of how the school is being used. It also seems that the technical service employees at the school could have contributed to a greater extent. There are some development potential for the next energy renovation processes.

Changes in behavior

The municipal properties have a certain idle consumption of energy, which is due to the technical facilities continuously running to keep the school warm and functional. In addition, it is the daily users, who are critical for the size of energy consumption. For instance, because they determine what the temperature should be and how lights are used. Consequently the daily users' awareness of energy means something for the implementation of energy savings.

Here it is especially the Energy Coordinator, who has focused on providing information and make everyday users aware of what their behavior means for energy consumption. She has conducted actual behavior campaigns. This kind of effort is more difficult to implement than the technical measures. It is hard to motivate users to stay focused on energy and there is less security of savings in the end. The effort typically also requires sustained initiatives to keep it up.

Carsten Kristensen, technical service personnel, doing his daily maintenance work on one of the schools.





In the energy renovation projects for the seven institutions there has so far not been implemented behavioral measures. 26,700 euros have been allocated for this purpose, but it is not decided yet how the money should be spent. According to the Energy Coordinator, it is essential that technical measures will be followed up with information and guidance on the changes. The reason is that there may otherwise be a risk that users will not acquire knowledge of the new systems correctly. For instance, that users continue airing out too much, although it is not necessary with the new ventilation.

This indicates that the municipality pays attention to users' importance in relation to energy savings. However, there is a tendency that there is a stronger focus on technical optimization. This is related to a focus on improving the buildings' energy framework which does not involve the use of the building. Similarly, the energy label overrides the behavioral measures. Thus, there is a challenge in terms of avoiding the emergence of a technical silo surrounding property management, who find it difficult to play along with the more social silos, such as school management. The technical service staff may in this context be important bridge builders.

The 'soft' values

In energy work there is generally a big emphasis on the financial benefits of energy savings. This is probably related to the fact that from a political standpoint investments should preferably be worthwhile. Conversely, the energy savings of course also provide the possible of other - so-called 'softer' - forms of gains. This may, for example, be a better indoor climate and better buildings to teach or care for children in. These reasons seem to be less central in the process.

This economic paradigm is largely driving the development process. It is driving for how much money is allocated. It is driving for which solutions are prioritized and selected. Solutions need to be economic and have a short repayment period.

The principal other municipal core value that comes into play is related to the economic aspects. It is the general maintenance of the buildings. There was a political ambition that the purpose is not 'only' to save energy. The savings would however, be implemented in order to simultaneously be an improvement of the properties.

The politicians wanted to make the properties better. This is reflected in the fact that not only have they selected to optimize the technical facilities, but also completed building improvements. The project managers thus prioritized actions with a longer repayment period, when there was a maintenance argument. Politicians have also been aware that energy renovation could improve the indoor environment. However, it is not something that has been directly calculated and worked hard on. Nor has there been a dialogue between the technical and social silos relating to e.g. incorporating school administration's interests.

The 'soft' values reflecting user interests are not so central to the thinking. This creates a technical approach to solutions which is recovered, and thus gives the desired positive development loop. A potential for development is then to experiment with what it would mean if the 'soft' values were increasingly a controlling part of the process.

Tools

A variety of tools are used to create an overview, establish an economic base and prioritize solutions. In the following, we attempt to describe some of the tools that support municipal employees in realizing energy reductions in practice.

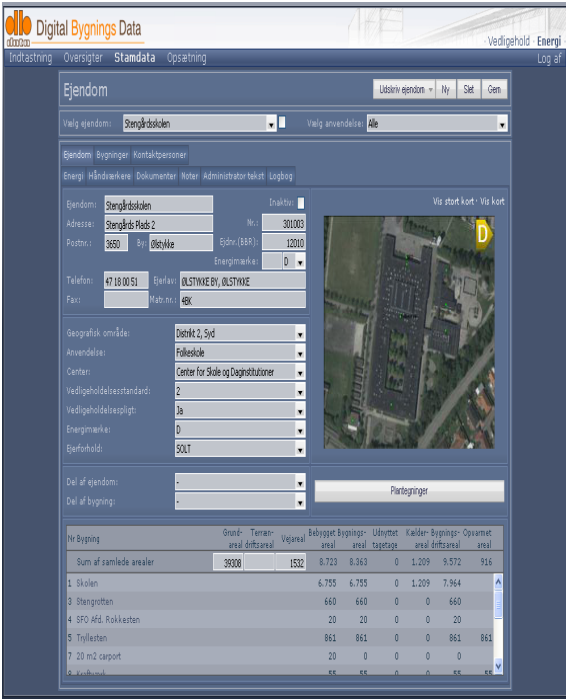
Policy objectives

The municipal strategy documents is an essential tool in aligning and integrating the political objectives in the daily administration. The use of strategies in Egedal is effective, because there is a reconciliation between politicians and administration. At the same time the strategies also maintain a responsive approach to the challenges. They designate areas, which the administration can lift here and now. Egedal Municipality e.g. have strategies for their Plan and Agenda 21, energy work and properties.



Recording and documentation

There are different databases that can help record and document various types of building and energy data. The databases are specifically designed to systematically record and keep track of progress over time.



The energy label contains a database of the buildings' energy consumption. In Egedal the energy label is used as a basis for establishing an energy saving catalog and calculating the investment potentials of the individual buildings. A major challenge with energy labels is that they are based on a number of conditions. This means that only certain technical elements are included, while behavioral measures are not recognized.

Digital Construction Data is a digital database of the municipal properties. Here, basic information and drawings of the buildings are kept. The database can also be used to prepare operation and maintenance plans. This database is used in Egedal Municipality to ensure a comprehensive overview of the buildings' maintenance-related condition and energy consumption. All continuous improvements are currently registered in the system through a requesting system.

Advice and expertise

There are various tools for obtaining technical advice. There are different forms of supply and counseling that municipalities can use in order to ensure that the solutions chosen are based on the latest knowledge. The solution can be sent directly out to

tender. This means that the municipality does not develop solutions themselves. Instead, they formulate some contractual requirements for the solving of the task, while the supply company carries out the work itself. The municipality may choose in connection with an offering to have its own advisor. This provides a technical partner who the municipality can lean against in relation to the technical parts that an external company supplies.

ESCO constitute a particular form of tender, where the companies that bid for the job provides a guarantee that the municipality will achieve the promised energy savings within a certain time frame. In Egedal were an ESCO tender was used, because it created a good political security of being sure to get the invested savings. The experience was not so good as the municipality spent quite a lot of resources on the completion of the offering. Moreover, the offering ended up in a legal battle about contract criteria. There are different variations of tender that the municipality can choose from. For instance, the municipality may also choose to put less work in the contract. In Egedal they chose to send energy renovation of one of the schools to tender to get some architectural skills involved that the municipality did not have in-house.

Economy

There are various financial tools that can be brought into play to ensure a financial basis for implementing energy savings. There may be various conditions associated with the tools.

Each local council has its own budget, in which they are able to allocate money to implement energy savings. Egedal Municipality decided to earmark funds for this purpose in the form of an "energy pool" that the Energy Coordinator may use.

ESCO also represents an economic tool because it provides an economic certainty that the projected savings are achieved through the financial guarantee.

The municipality may have access to loans for energy-saving measures, depending on the national funding schemes. In a Danish context, a municipality has the opportunity to go beyond the budget they have available, if it is possible to finance the loan. In Egedal Municipality, the local council decided to use this particular loan access to their energy measures in municipal buildings. The municipality has especially attractive terms for such loans, because the municipality has entered into a sell and rent back agreement relating to certain buildings. This means that today there is deposited nearly a 133 million euros for buying back the properties. The council has been able to borrow this money and take out security under advantageous terms.

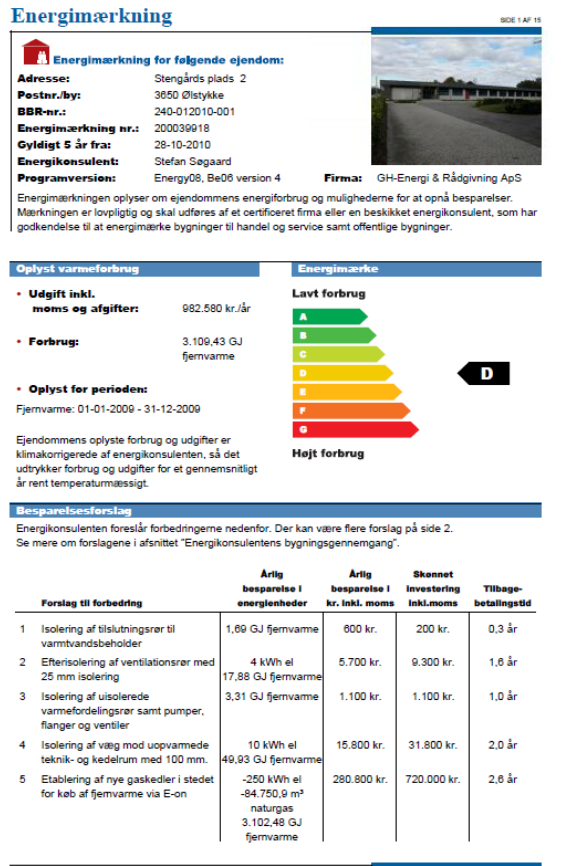
The municipality can also borrow quality funds to renovate municipal buildings. E.g. in Denmark, there has been established a quality fund totaling 2,9 billion euros for government financial participation in municipal investment in 2009-2018. The purpose of these funds is to elevate the physical environment of public service areas, such as children and young people and the elderly.

One last economic tool is outside pools, which provides grants for special projects. In Egedal, energy savings in municipal buildings are partially funded by a European demonstration and development project called Concerto Plus

Technical choices

There are various tools that can support the prioritization of the technical solutions in terms of creating an overview of investment and repayment period. In the Danish energy labelling there are some XML files that contain all of the assumptions used to calculate the energy label for the relevant buildings. For

instance, it says how big the building is, how much ventilation there is, etc. Egedal Municipality's advisor has used these XML files as a basis for their calculations before and after situations of savings.



Another tool is a simple spreadsheet that makes it possible to establish an energy saving catalog of the potential savings. In Egedal the advisor compiled such a list of possible cost-cutting measures. Then for each savings is calculated a before and after situation and explained the investment and savings potential. The spreadsheet is used as an ongoing list of potential savings and is the basis responsible for prioritizing these.

What can we learn?

Developing innovative practices is about finding solutions for how energy savings can be realized here and now. Solutions need to be able to promote energy savings in the current framework and conditions. They will build on - but also challenge - the rules that already exist.

The analysis of the work of Egedal indicate that there are several platforms in the municipal organization that need to be connected. Solutions need to span completely from the political level over plans to project scrutiny, design, operation and daily use. This span means that political ambitions are associated with the way of working with the challenges of the organization, and vice versa.

A key challenge is to launch some short-term initiatives in the organization. Within the whole span. And that together they act as a lever for the energy measures.

Close dialogue between the administration and politicians create greater recognition for the administrative / political conditions. It may help to work through some realistic ambitions, so there will be pulled in the same direction.



Political collaboration across interests create greater consensus in the short term and stability in the long run.



Making use of the building and system technical expertise allows for more holistic and comprehensive financial solutions.

Making use of local knowledge of the buildings creates opportunities for practical and efficient solutions

Involvement of the daily users of the building opens up for including behavioral considerations.



The short-term initiatives in the organization are important to launch. But it is also important to maintain the long-term perspective. To recognize that it is a learning process in which initiatives should be regularly evaluated and developed. The interaction between the short and the long run should over time help to strengthen the energy considerations throughout the span of the municipal organization. The analysis has also identified a number of specific tools that municipalities have available to support the development process. The key is to utilize the tools that already exist and bring them constructively into play.

One danger of developing innovative practices is that it can be so-so with the new. Consequently, it is essential to keep in mind that it has to be innovative. The ambition should be new thinking - to challenge and change the organization's way of working. But it should be done in a thoughtful and respectful manner. One can always argue whether the ambitions of Egedal were high enough - whether there could conceivably have been more new thinking than what was. One of the things that the municipality at least thought new was to improve the building framework. In this way, the process was not only about changing individual

technologies, but about an overall boost of the building framework. Eventually, it would be exciting if behavioral components were increasingly connected to this kind of process, so that the effort will not only be technical, but also strongly integrate complex user perspectives.

Systematic recording and analysis of the buildings and energy consumption makes it possible to identify, where there may be worked. It also creates reasoning for why it is necessary for others.



Focused attention towards the focal points of the organization allows to challenge the essential work. This provides insight into who is doing what, and what it means for the integration of energy saving.

Local ownership allows for bringing other core values besides energy in the municipal organization into play.



Class 1 (<http://www.class1.dk/>) is a development project within the EU Concerto Programme. Class 1 stands for: “Cost-effective low-energy Advanced Sustainable So1utions”. The project involves new built of more than 100 homes in the development area ‘Stenlose South’, as well as a kindergarten and a senior citizens house. It also includes the energy renovation of two schools and five institutions in the municipality, and the installation of more than 500 kWp solar panels on municipal buildings.

A *CONCERTO* (<http://concerto.eu/concerto/>) project will combine:

- Energy conservation and renewable energy
- Research, development and demonstration
- Contribution from different countries
- Education and communication

Thanks to:

● Jan Poulsen, Specialist Consultant, Planning and Energy

● Lisbeth Berg, Energy Coordinator, Project and Facility

● Morten Haunstrup, Project Manager, Project and Facility

● Mahmoud Hamade, Project Manager, Project and Facility

● Heidi Wang, Deputy Principal at the Stengard School

● Bo Christensen, Technical Service Personnel at the Stengard School

● Ib Sorensen, Chairman of the Planning Committee

● Ove Morck, Project Manager for the Class 1 project, Cenergia

● Henrik Langekilde, Advisor from Jens-Peter Madsen ApS, Consulting Engineers

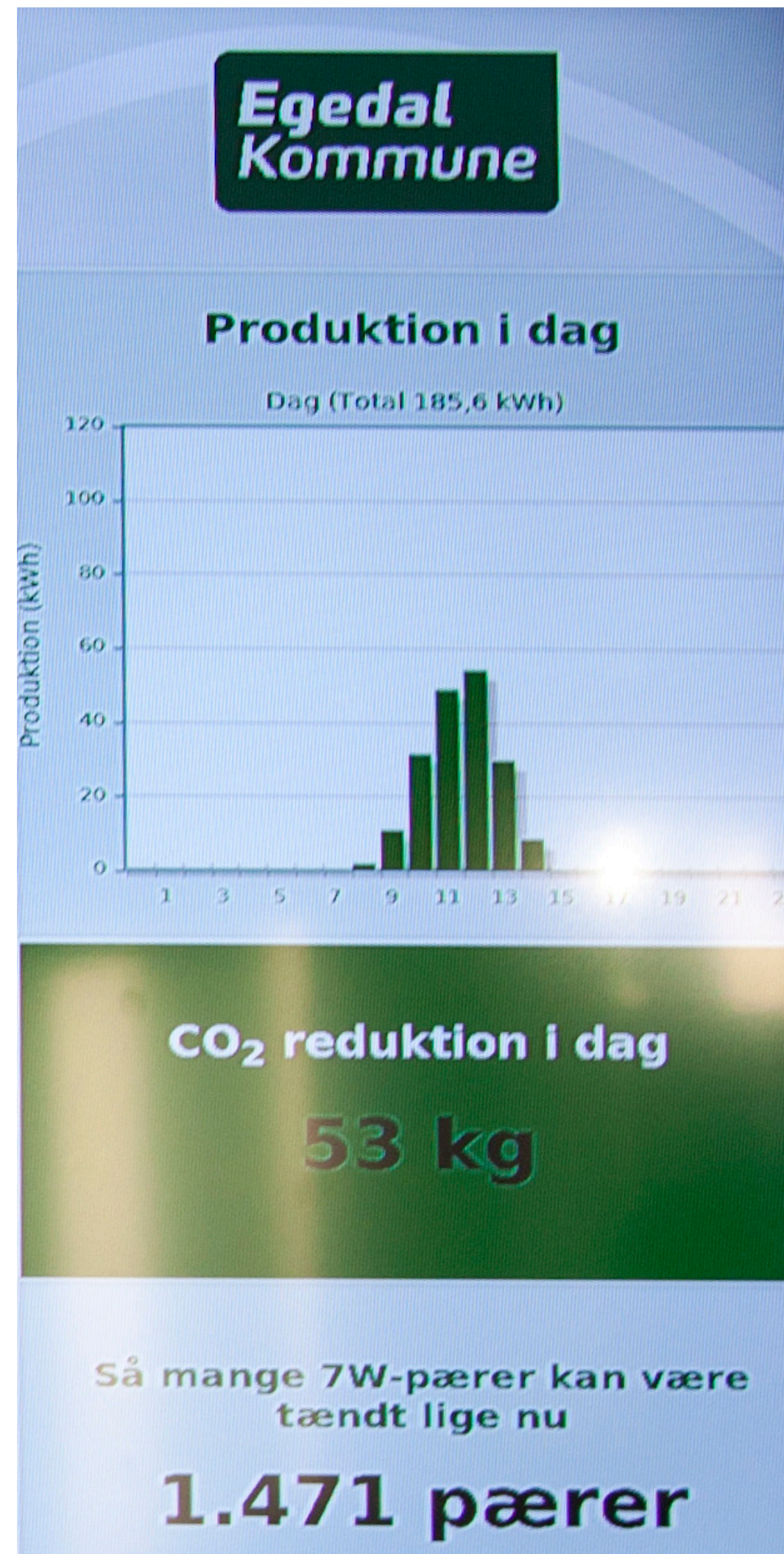
for taking part in interviews

● Carsten Kristensen, Technical Service Personnel at the Stengard School

● Bea Wood

● and more of the interviewees

for spending time with the photograph



Municipalities can pave the way to concrete energy savings

